Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method for growing a crystal of an Al-containing III-V group compound semiconductor containing Al as a group III element by vapor phase epitaxy in a reaction chamber made only of quartz material, comprising:

a first step of reacting a solid Al with a halogenated hydrogen at a temperature of 700°C or below to produce a halogenated product of Al, wherein the first step occurs in a first reaction zone of the reaction chamber; and

a second step of reacting the halogenated product of Al produced in the first step with a gas containing a group V element at a temperature of 1200°C to 1300°C on the surface of a substrate crystal so as to grow a III-V group compound semiconductor on the substrate crystal, wherein the second step occurs in a second reaction zone of the reaction chamber.

2. (Currently Amended) A method for growing a crystal of an Al-containing III-V group compound semiconductor containing Al as a group III element by vapor phase epitaxy in a reaction chamber made only of quartz material, comprising:

a first step of reacting a solid mixture of group III metals including Al with a halogenated hydrogen at a temperature of 700°C or below to produce a halogenated product of group III, wherein the first step occurs in a first reaction zone of the reaction chamber; and

a second step of reacting the halogenated product of group III produced in the first step with a gas containing a group V element at a temperature of 1200°C to 1300°C on the surface of a substrate crystal so as to grow a III-V group compound semiconductor on the substrate crystal, wherein the second step occurs in a second reaction zone of the reaction chamber.

3. (Previously Presented) The method for growing a crystal of an Al-containing III-V group compound semiconductor containing Al as a group III element by vapor phase epitaxy according to claim 1, wherein the halogenated hydrogen is hydrogen chloride, hydrogen bromide, or hydrogen iodide.

4. (Currently Amended) A method for producing an Al-containing III-V group compound semiconductor in a reaction chamber made only of quartz material by repeating a vapor phase epitaxial growth process to deposit layers of III-V group compound semiconductors of different compositions containing Al as a group III element, the method comprising:

a first step of reacting a solid Al with a halogenated hydrogen at a temperature of 700°C or below to produce an halogenated product of Al, wherein the first step occurs in a first reaction zone of the reaction chamber; and

a second step of reacting the halogenated product of Al produced in the first step with a gas containing a group V element at a temperature of 1200°C to 1300°C on the surface of a substrate crystal so as to grow a III-V group compound semiconductor on the substrate crystal, wherein at least one of the amount of the halogenated hydrogen used in the first step, the amount of a carrier gas for the halogenated hydrogen used in the first step, and the amount of the group V element-containing gas used in the second step is varied to deposit III-V group compound semiconductors having different compositions, wherein the second step occurs in a second reaction zone of the reaction chamber.

5. (Currently Amended) A method for producing an Al-containing III-V group compound semiconductor in a reaction chamber made only of quartz material by repeating a vapor phase epitaxial growth process to deposit layers of III-V group compound semiconductors of different compositions containing Al as a group III element, the method comprising:

a first step of reacting a solid mixture of group III metals including Al with a halogenated hydrogen at a temperature of 700°C or below to produce a halogenated product of Al, wherein the first step occurs in a first reaction zone of the reaction chamber; and

a second step of reacting the halogenated product of Al and the halogenated product of group III metals other than Al produced in the first step with a gas containing a group V element at a temperature of 1200°C to 1300°C on the surface of a substrate crystal so as to grow a III-V group compound semiconductor on the substrate crystal in the vapor phase, wherein at least one of the amount of the halogenated hydrogen used in the first step, the amount of a carrier gas for the halogenated hydrogen used in the first step, and the amount of the group V element-containing gas used in the second step is varied to deposit III-V group compound semiconductors having different compositions, wherein the second step occurs in a second reaction zone of the reaction chamber.

6. (Previously Presented) The method for producing an Al-containing III-V group compound semiconductor according to claim 4, wherein the halogenated hydrogen is hydrogen chloride, hydrogen bromide, or hydrogen iodide, and the carrier gas for the halogenated hydrogen is hydrogen, an inert gas, or a mixture of hydrogen and an inert gas.

7. (Previously Presented) An apparatus for producing an Al-containing III-V group compound semiconductor by growing its crystal by hydride vapor phase epitaxy; the apparatus comprising:

a single wall reaction chamber made only of quartz, the single reaction chamber including:

a first reaction zone maintained at a temperature of 700°C or below; and

a second reaction zone maintained at a temperature of 700°C to 1300°C.

8. (Original) The apparatus for producing an Al-containing III-V group compound semiconductor according to claim 7, wherein the first reaction zone includes support means for supporting a solid Al or a solid mixture of group III metals including Al, introduction means for introducing an halogenated hydrogen, and introduction means for introducing a carrier gas for the halogenated hydrogen; the second reaction zone includes support means for supporting a seed crystal substrate, introduction means for introducing the halogenated products produced in the first reaction zone, and introduction means for introducing a gas containing a group V element.

9. (Previously Presented) The apparatus for producing an Al-containing III-V group compound semiconductor according to claim 7, wherein a halogenated product of Al or a solid mixture of group III metals including Al is produced in the reaction in the first reaction zone, and a III-V group compound semiconductor is grown on the seed crystal substrate by vapor phase epitaxy in the reaction in the second reaction zone.

10. (Previously Presented) The apparatus for producing an Al-containing III-V group compound semiconductor according to claim 8, comprising:

a quartz reaction tube, within which the first reaction zone and the second reaction zone are arranged adjacent to one another;

first heating means arranged at a position of the quartz reaction tube corresponding to the first reaction zone; and

second heating means arranged at a position of the quartz reaction tube corresponding to the second reaction zone;

wherein the halogenated product produced in the first reaction zone is carried by the flow of the gas introduced into the first reaction zone to the second reaction zone.

11. (Previously Presented) The apparatus for producing an Al-containing III-V group compound semiconductor according to claim 8, wherein the halogenated hydrogen is

hydrogen chloride, hydrogen bromide, or hydrogen iodide, and the carrier gas for the halogenated hydrogen is hydrogen, an inert gas, or a mixture of hydrogen and an inert gas.

12. (Previously Presented) The method for growing a crystal of an Al-containing III-V group compound semiconductor containing Al as a group III element by vapor phase epitaxy according to claim 2, wherein the halogenated hydrogen is hydrogen chloride, hydrogen bromide, or hydrogen iodide.

13. (Previously Presented) The method for producing an Al-containing III-V group compound semiconductor according to claim 5, wherein the halogenated hydrogen is hydrogen chloride, hydrogen bromide, or hydrogen iodide, and the carrier gas for the halogenated hydrogen is hydrogen, an inert gas, or a mixture of hydrogen and an inert gas.

14. (Previously Presented) The apparatus for producing an Al-containing III-V group compound semiconductor according to claim 8, wherein a halogenated product of Al or a solid mixture of group III metals including Al is produced in the reaction in the first reaction zone, and a III-V group compound semiconductor is grown on the seed crystal substrate by vapor phase epitaxy in the reaction in the second reaction zone.

15. (Previously Presented) The apparatus for producing an Al-containing III-V group compound semiconductor according to claim 9, comprising:

a quartz reaction tube, within which the first reaction zone and the second reaction zone are arranged adjacent to one another;

first heating means arranged at a position of the quartz reaction tube corresponding to the first reaction zone; and

second heating means arranged at a position of the quartz reaction tube corresponding to the second reaction zone;

wherein the halogenated product produced in the first reaction zone is carried by the flow of the gas introduced into the first reaction zone to the second reaction zone.

16. (Previously Presented) The apparatus for producing an Al-containing III-V group compound semiconductor according to claim 9, wherein the halogenated hydrogen is hydrogen chloride, hydrogen bromide, or hydrogen iodide, and the carrier gas for the halogenated hydrogen is hydrogen, an inert gas, or a mixture of hydrogen and an inert gas.

17. (Previously Presented) The apparatus for producing an Al-containing III-V group compound semiconductor according to claim 10, wherein the halogenated hydrogen is hydrogen chloride, hydrogen bromide, or hydrogen iodide, and the carrier gas for the halogenated hydrogen is hydrogen, an inert gas, or a mixture of hydrogen and an inert gas.

18. (Previously Presented) A method for growing a crystal of AlN semiconductor by vapor phase epitaxy according to claim 1, wherein the second step comprises reacting the halogenated product of Al produced in the first step with a gas containing N.